

### REMARKS

The Examiner rejected claims 5, 10-12, 55-58, 61-62, 67 and 69 under 35 U.S.C. § 102(b) as allegedly being anticipated by Gofuku *et al.* 4,785,157, previously applied.

The Examiner rejected claims 4, 47, 63, 64-65 and 71-73 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mochizuki 4,533,935, in view of Gofuku *et al.* 4,785,157, both are previously cited.

The Examiner rejected claims 16, 20 and 23-24 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Basseches *et al.* 3,148,129 in view of Poisel 4,485,370, Mochizuki 4,533,935, previously applied, and Lerner 5,167,935, newly cited.

The Examiner rejected claims 49-50, 66 and 76 under 35 U.S.C. § 103 as allegedly being unpatentable over Basseches *et al.* in view of Poisel as applied to claims 16, 20, 23-24 above, and further in view of Mochizuki 4,533,935, Gofuku *et al.* 4,785,157 and Skill level of an ordinary person in the art, previously cited.

The Examiner rejected claim 59 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art, previously applied.

The Examiner rejected claim 60 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above, and further in view of Background of the invention of Gofuku *et al.* 4,785,157.

The Examiner rejected claims 51-54 and 68 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above,

and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, previously applied

The Examiner rejected claim 70 under 35 U.S.C. § 103 as allegedly being unpatentable over Mochizuki in view of Gofuku *et al.* as applied to claims 4, 47, 63, 64-66 and 71-73 above, and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, previously applied.

Applicants respectfully traverse the §102 and § 103 rejections with the following arguments.

**35 U.S.C. § 102(b): Claims 5, 10-12, 55-58, 61-62, 67, and 69 (Gofuku)**

The Examiner rejected claims 5, 10-12, 55-58, 61-62, 67 and 69 under 35 U.S.C. § 102(b) as allegedly being anticipated by Gofuku *et al.* 4,785,157, previously applied.

Applicants respectfully contend that Gofuku does not anticipate claims 5 and 67, because Gofuku does not teach each and every feature of claims 5 and 67. For example, Gofuku does not teach the feature: “heating a portion of the surface layer at a heating temperature, ... wherein heating the portion of the surface layer includes directing a beam into the portion of the surface layer such that the beam causes the heating of the portion of the surface layer, and wherein the beam is selected from the group consisting a beam of radiation and a beam of particles”

The preceding features of claims 5 and 67 require that a portion of the surface layer of the resistor be heated at a heating temperature, wherein the beam causes the heating of the portion of the surface layer of the resistor.

The Examiner argues that Gofuku teaches the preceding feature of claims 5 and 67, but does not provide any citation to Gofuku that allegedly teaches the preceding feature of claims 5 and 67.

Applicants respectfully contend that Gofuku does not teach that the beam of radiation causes heating of a portion of the surface layer of the resistor. In fact, there is no discussion anywhere in Gofuku of heating anything. The disclosed function of the beam of radiation in Gofuku is not a heating function, but rather the function of causing a change in the chemical state of the resistor so as to change (i.e., increase or decrease) the electrical resistance of the resistor, See Gofuku, col. 4, line 64 - col. 5, line 15; col. 6, lines 22-33; col. 7, lines 36-42.

Further more, the Examiner has not provided evidence allegedly showing that Gofuku

inherently teaches that the beam of radiation causes heating of a portion of the surface layer of the resistor.

Applicants respectively point out that it has been known since 1955 that laser radiation can cool a material which the laser radiation strikes (see, e.g., <http://www.lanl.gov/orgs/pa/science21/LaserCooling.html>, [http://electron9.phys.utk.edu/optics507/modules/m10/laser\\_cooling.htm](http://electron9.phys.utk.edu/optics507/modules/m10/laser_cooling.htm), United States Patent 5,615,558 issued April 1, 1997 to Cornell et al., col. 1, line 65 - col. 2, line 6 (“This invention provides a device and method for cooling solids utilizing laser optics. The device is of solid state construction and can be inexpensively produced. The device includes a crystalline structure which is itself cooled when illuminated with a laser beam of selected frequency by emission of photons of higher energy than photons entering the mechanism, the additional energy being accounted for by process of absorption of thermal phonons from the crystal lattice. ”).

Based on the preceding arguments, Applicants respectfully maintain that Gofuku does not anticipate claims 5 and 67, and that claims 5 and 67 are in condition for allowance. Since claims 10-12, 55-58, and 61-62 depend from claim 5, Applicants contend that claims 10-12, 55-58, and 61-62 are likewise in condition for allowance. Since claim 69 depends from claim 67, Applicants contend that claim 69 is likewise in condition for allowance.

In addition with respect to claim 12, Applicants respectfully contend that Gofuku does not teach the feature: “wherein  $F = 1$ ”.

The Examiner argues: “F can be equal to 1, when laser beam 6, 7 scans entire surface of resistor layer1, fig. 1.”

In response, Applicants assert that Gofuku does not anywhere teach that the laser beam 6, 7 scans entire surface of resistor layer1. FIG. 1 most certainly not disclose that the laser beam 6, 7 scans entire surface of resistor layer1.

Therefore, Gofuku does not teach the preceding feature of claim 12.

In addition with respect to claim 55, Applicants respectfully contend that Gofuku does not teach the feature: “wherein said oxidizing results in a thickness of the oxidized portion of the surface layer being an increasing function of an energy flux of the beam”.

The Examiner argues: “regarding claim 55, wherein the thickness of the oxidized portion of the surface being increasing function of an energy flux of the beam (output power, number of pulses and pulse width, etc), col.6, lines 8-32 and claims 3-5”.

In response, Applicants assert that Gofuku, col.6, lines 8-32 and claims 3-5 does not discuss how the thickness of the oxidized portion of the surface varies with the energy flux of the beam, and most certainly teach that the thickness of the oxidized portion of the surface is an increasing function of an energy flux of the beam.

Therefore, Gofuku does not teach the preceding feature of claim 55.

In addition with respect to claim 58, Applicants respectfully contend that Gofuku does not teach the feature: “wherein the gas is a non-flowing gas” in combination with “wherein the gas includes oxygen-comprising molecules”.

The Examiner argues: “regarding claim 58, the gas in non-flowing, col. 6, lines 54-60”.

In response, Applicants assert that Gofuku, col.6, lines 41-44 and 54-60 teaches a flowing

gas that includes oxygen-comprising molecules. In addition, Gofuku, col.6, lines 54-60 teaches a non-flowing gas in a fluid-tight sealed vessel, but does not teach that the non-flowing gas in the fluid-tight sealed vessel includes oxygen-comprising molecules.

Therefore, Gofuku does not teach the preceding feature of claim 58.

**35 U.S.C. § 102(b): Claims 4, 47, 63, 64-65, and 71-73 (Mochizuki in view of Gofuku)**

The Examiner rejected claims 4, 47, 63, 64-65, and 71-73 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mochizuki 4,533,935, in view of Gofuku *et al.* 4,785,157, both are previously cited.

Since claims 4, 47, 63, 64-65, and 71-73 have been canceled, the rejection of claims 4, 47, 63, 64-65, and 71-73 under 35 U.S.C. § 103(a) is moot.

**35 U.S.C. § 103(a): Claims 16, 20, 23-24 (Basseches in view of Poisel, Mochizuki, Lerner)**

The Examiner rejected claims 16, 20 and 23-24 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Basseches *et al.* 3,148,129 in view of Poisel 4,485,370, Mochizuki 4,533,935, previously applied, and Lerner 5,167,935, newly cited.

**Claim 16**

Applicants respectfully contend that claim 16 is not unpatentable over Basseches in view of Poisel, because Basseches in view of Poisel, Mochizuki, and Lerner does not teach or suggest each and every feature of claim 16. For example, Basseches in view of Poisel, Mochizuki, and Lerner does not teach or suggest the feature: “oxidizing a portion of the surface layer by reacting said portion with the oxygen ions **at a temperature above ambient room temperature** such that an electrical resistance of the resistor is increased” (emphasis added).

Based on the preceding arguments, Applicants respectfully maintain that claim 16 is not unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner, and that claim 16 is in condition for allowance.

**Claim 20**

Applicants respectfully contend that claim 20 is not unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner, because Basseches in view of Poisel, Mochizuki, and Lerner does not teach or suggest each and every feature of claim 20. For example, Basseches in view of Poisel, Mochizuki, and Lerner does not teach or suggest the feature: “providing a chemical solution which includes oxygen particles in an oxygen-comprising gas dissolved in the chemical



solution **under pressurization**; ... oxidizing a portion of the surface layer of the resistor by chemically reacting the oxygen particles with the portion of the surface layer such that an electrical resistance of the resistor is increased”.

The cites Basseches as the primary reference and Basseches teaches use of an anodization circuit to increase the resistance of a resistor 3 immersed in an electrolytic solution 5.

The Examiner argues that “Lerner teaches at abstract, col. 5, lines 1-65, col. 8, lines 34-43, nitric acid reacting to oxygen under pressurized vessel to produce nitric acid.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Basseches et al.'s process by using a nitric acid formed from pressurized oxygen as oxidizing solution as suggested by Lerner because nitric acid reacts with oxygen under pressurized vessel to produce a final product of nitric acid containing pure  $\text{NO}_3$  without  $\text{NO}_x$ .”

In response, Applicants respectfully contend that the Lerner, col. 5, lines 7-31 teaches: “The absorber contains a solution of nitric acid containing nitrous acid.... It has been discovered that by passing the nitric acid/nitrous acid from the absorber to the oxygenation vessel, the treated solution's capacity for NO dissolution in the absorber is remarkably enhanced. Specifically, it has been discovered in the actual , use of the apparatus of this invention that when liquid from an absorber in an  $\text{NO}_x$  absorption process is treated with oxygen in a closed vessel, and is then returned to the absorber, the absorption of NO, which is normally substantially insoluble, becomes far higher than the absorption of the substantially soluble  $\text{NO}_2$ , as  $\text{N}_2\text{O}_4$ .”

Therefore, Lerner does not teach or suggest “a chemical solution which includes oxygen particles in an oxygen-comprising gas dissolved in the chemical solution under pressurization” as required by claim 20. Rather, Lerner teaches use of oxygen gas under pressurization to enhance

the absorption of NO in an absorber.

In addition, Applicants assert that the Examiner has not provided any motivation or suggestion from the prior art to modify an anodization apparatus through use of such pressurization. More specifically, the Examiner has not provided any motivation or suggestion from the prior art to modify the anodization apparatus of Basseches to have the oxygen-comprising gas dissolved in the electrolytic solution under pressurization in the anodization apparatus. The Examiner has not provided evidence that the anodization apparatus of Basseches would work more effectively to justify the added expense and complexity of having the oxygen-comprising gas dissolved in the electrolytic solution under pressurization. Moreover, there is no evidence in the prior art of enablement of such pressurization in an anodization apparatus, and it is quite possible that having the oxygen-comprising gas dissolved in the electrolytic solution under pressurization in Basseches' anodization apparatus would work less effectively or not function properly.

Based on the preceding arguments, Applicants respectfully maintain that claim 20 is not unpatentable over Basseches in view of Poisel, Mochizuki and Lerner, and that claim 20 is in condition for allowance.

#### Claims 23 and 24

Applicants respectfully contend that claim 23 is not unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner, because Basseches in view of Poisel, Mochizuki, and Lerner does not teach or suggest each and every feature of claim 23. For example, Basseches in view of

Poisel, Mochizuki, and Lerner does not teach or suggest the features: “providing a predetermined target resistance in terms of a value  $R_t$  and a tolerance  $\Delta R_t$  for the electrical resistance of the resistor; ... testing the resistor during the oxidizing step to determine whether the electrical resistance of the resistor is within  $R_t \pm \Delta R_t$ ”.

The Examiner argues: “Basseches et al. discloses ... testing (monitoring with monitor means 10) the resistor 3 during the oxidizing step to determine the desired resistance has been attained, col. 2, lines 39-55, col. 3, lines 3-60”.

In response, Applicants assert that Basseches, col. 2, lines 39-55 does not disclose the preceding feature of claim 23. Although Basseches teaches continuous monitoring to determine when the desired resistance has been attained, Basseches does not disclose providing a predetermined tolerance  $\Delta R_t$  and utilizing the predetermined tolerance  $\Delta R_t$  to determine when the desired resistance has been attained as required by claim 23.

In response, Applicants assert that Basseches, col. 3, lines 3-60 does not disclose the preceding feature of claim 23. Although Basseches recites in column 5 of Table 1 the percent deviation of the actual resistance value from the desired resistance value, the tabulation in Table 1 reflects the results of the experiment. In contrast, claim 23 requires that **the resistor be tested during the oxidizing step** to determine whether the electrical resistance of the resistor is within  $R_t \pm \Delta R_t$ , which Basseches does not teach or suggest.

Based on the preceding arguments, Applicants respectfully maintain that claim 23 is not unpatentable over Basseches in view of Poisel, Mochizuki and Lerner, and that claim 23 is in condition for allowance. Since claim 24 depends from claim 23, Applicants contend that claim 24 is likewise in condition for allowance.

In addition with respect to claim 24, Applicants respectfully contend that Basseches in view of Mochizuki in view of Poisel, Mochizuki and Lerner does not teach or suggest the following features of claim 24:

“wherein if during the testing step the electrical resistance of the resistor is determined to not be within  $R_t \pm \Delta R_t$ , then the method further comprises:

iterating such that each iteration of the iterating includes additionally executing the exposing and oxidizing steps and additionally testing the resistor during the oxidizing step to determine whether  $R_2''$  is within  $R_t \pm \Delta R_t$ , wherein  $R_2''$  is a latest value of the electrical resistance of the resistor as determined by said testing; and

ending the iterating if  $R_2''$  is within  $R_t \pm \Delta R_t$  or if  $(R_2'' - R_1)(R_1 - R_2'') < 0$ , wherein  $R_1$  is a latest value of the determined electrical resistance of the resistor immediately prior to said testing.”

The Examiner has not even addressed the preceding features of claim 24 and has therefore not established a *prima facie* case of obviousness in relation to claim 24.

**35 U.S.C. § 103(a): Claims 49-50, 66, and 76: (Basseches in view of Mochizuki and**

**Skill Level of an Ordinary Person in the Art)**

The Examiner rejected claims 49-50, 66 and 76 under 35 U.S.C. § 103 as allegedly being unpatentable over Basseches *et al.* in view of Poisel as applied to claims 16, 20, 23-24 above, and further in view of Mochizuki 4,533,935, Gofuku *et al.* 4,785,157 and Skill level of an ordinary person in the art, previously cited.

**Claims 49-50**

Since claims 49-50 depend from claim 23, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner under 35 U.S.C. §103(a), Applicants maintain that claims 49-50 are likewise not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art under 35 U.S.C. §103(a).

In addition with respect to claims 50, Applicants respectfully contend that Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art person does not teach or suggest the following features of claim 50: “wherein  $F = 1$ ” (claim 50).

The Examiner argues: “Gofuku *et al.* teaches at fig. 1, wherein ...  $F$  can be equal to 1, when laser beam 6, 7 scans entire surface of resistor layer 1.”

In response, Applicants assert that Gofuku does not anywhere teach or suggest that the laser beam 6, 7 scans entire surface of resistor layer1. FIG. 1 most certainly not disclose that the laser beam 6, 7 scans entire surface of resistor layer1.

Based on the preceding arguments, Applicants respectfully maintain that claims 49-50 are

not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art, and that claims 49-50 are in condition for allowance.

#### Claim 66

Since claim 66 depends from claim 23, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner under 35 U.S.C. §103(a), Applicants maintain that claim 66 is likewise not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art under 35 U.S.C. §103(a).

Based on the preceding arguments, Applicants respectfully maintain that claim 66 is not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art, and that claim 66 is in condition for allowance.

#### Claim 76

Since claim 76 depends from claim 20, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel, Mochizuki, and Lerner under 35 U.S.C. §103(a), Applicants maintain that claim 76 is likewise not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art under 35 U.S.C. §103(a).

Based on the preceding arguments, Applicants respectfully maintain that claim 76 is not unpatentable over Basseches in view of Poisel, Mochizuki, Gofuku, and Skill level of an ordinary person in the art, and that claim 66 is in condition for allowance

**35 U.S.C. § 103(a): Claim 59 (Gofuku in view of Mochizuki and Skill Level of an Ordinary Person in the Art)**

The Examiner rejected claim 59 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art, previously applied.

Since claim 59 depends from claim 5, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 59 is likewise not unpatentable over Gofuku in view of Mochizuki and skill level of an ordinary person in the art under 35 U.S.C. §103(a).

Based on the preceding arguments, Applicants respectfully maintain that claim 59 is not unpatentable over Gofuku in view of Mochizuki and skill level of an ordinary person in the art, and that claim 59 is in condition for allowance.

**35 U.S.C. § 103(a): Claim 60 (Gofuku in view of Background of the Invention of Gofuku)**

The Examiner rejected claim 60 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above, and further in view of Background of the invention of Gofuku *et al.* 4,785,157.

Since claim 60 depends from claim 5, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 60 is likewise not unpatentable over Gofuku in view of Background of the invention of Gofuku under 35 U.S.C. §103(a).

Based on the preceding arguments, Applicants respectfully maintain that claim 60 is not unpatentable over Gofuku in view of Background of the invention of Gofuku, and that claim 60 is in condition for allowance.



**35 U.S.C. § 103(a): Claims 51-54 and 68 (Gofuku in view of Wang and Blanchard)**

The Examiner rejected claims 51-54 and 68 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 5, 10-12, 55-58, 61-62, 67 and 69 above, and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, previously applied.

Since claims 51-54 depend from claim 5, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claims 51-54 are likewise not unpatentable over Gofuku in view of Wang and Blanchard under 35 U.S.C. §103(a).

Since claim 68 depends from claim 67, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 67 is likewise not unpatentable over Gofuku in view of Wang and Blanchard under 35 U.S.C. §103(a).

In addition, Applicants respectfully contend that Gofuku in view of Wang and Blanchard does not teach or suggest the following features of claims 51-54, and 68:

“wherein the beam is the beam of particles” (claim 51);

“wherein the beam is the beam of particles is a beam of electrons” (claim 52);

“wherein the beam is the beam of particles is a beam of protons” (claim 53);

“wherein the beam is the beam of particles is a beam of electrons” (claim 54); and

“wherein the molecules at the molecular concentration consist of nitrogen-comprising molecules at the nitrogen concentration” (claim 68); and

The Examiner argues: “Gofuku et al. teaches increasing the resistance in a portion of a resistor with laser beam radiation and oxygen gas but does not teach using electron beam or ion beam and using nitrogen gas. However, Wang teaches at col.4, lines 1-17, using ion beam

radiation and nitrogen to change the resistivity of a resistor. And, Blanchard teaches at col. 3, lines 23-36, using electron beam radiation to change the resistivity of an resistor. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with ion beam or electron beam and/or nitrogen to change the resistivity because ion beam or electron beam would react with the resistor so that the resistivity is altered.”

In response, Applicants maintain that the Examiner’s argument (i.e., it is obvious “to change the resistivity ... so that the resistivity is altered”) is circular reasoning and thus not persuasive.

In addition with respect to claim 53, neither Wang nor Banchard teach that the beam of particles is a beam of protons.

In addition with respect to claim 68, Wang, col.4, lines 1-17 teaches that the beam of particles is a beam of nitrogen ions, rather than a beam of nitrogen-comprising molecules as claimed.

Based on the preceding arguments, Applicants respectfully maintain that claims 51-54 and 68 are not unpatentable over Gofuku in view of Wang and Blanchard, and that claims 51-54, and 68 are in condition for allowance.

**35 U.S.C. § 103(a): Claim 70 (Gofuku in view of Wang and Blanchard)**

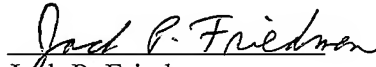
The Examiner rejected claim 70 under 35 U.S.C. § 103 as allegedly being unpatentable over Mochizuki in view of Gofuku *et al.* as applied to claims 4, 47, 63, 64-66 and 71-73 above, and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, previously applied.

Since claim 70 has been canceled, the rejection of claim 70 under 35 U.S.C. § 103(a) is moot.

### CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account No. 09-0457.

Date: 02/09/2007

  
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